In this paper we have studied characteristics of thunderstorms producing extreme weather events in detail both from ground-based and satellite measurements. We focused on two types of thunderstorms producing wind gusts (downbursts) and heavy precipitations in summer time in Japan. Total lightning continuously monitored by JTLN (Japanese Total Lightning Network) deployed by UEC over Japan were utilized to identify Lightning Jump (LJ: sudden increase in lightning discharges) before extreme weather occurrence indicative of updraft intensification in the storm cell. LJ is suggested to be useful for severe event prediction. The thunderstorm cells were identified and tracked by using the volume scan data from X-band high speed Doppler weather radar, which provides the information on how the thunderstorms evolve both in space and time coordinates. Moreover, Japanese geostationary meteorological satellite (Himawari 8) data from different optical bands were used to identify the meteorological conditions around the target thunderstorm cells such as cloud top height and amount of water vapor in different altitude. Above-mentioned physical parameters from lightning and satellite measurements are combined with radar volume scan data to elucidate the in-cloud meteorological conditions generating total LJ and extreme weather event onset.